

**What Is Claimed Is:**

1. An electro-static chuck with non-sintered aluminum nitride (AlN) comprising a coating layer of aluminum nitride as a dielectric of the electro-static chuck.

2. The electro-static chuck according to claim 1, in which the coating layer of aluminum nitride is formed by depositing aluminum nitride powder by cold spray coating.

3. The electro-static chuck according to claim 1, in which the electro-static chuck comprises:  
a substrate formed of aluminum alloy, copper, copper alloy or ceramic;

a first aluminum nitride (AlN) layer formed on the substrate by cold spray coating;

an electrode formed with a separation of a distance from the circumference of the first aluminum nitride to the center on the first aluminum nitride (AlN) layer; and

a second aluminum nitride (AlN) layer formed by cold spray coating to cover the whole of the electrode and the separation.

4. The electro-static chuck according to claim 3, in which the first aluminum nitride layer has a thickness of 0.2 to 1.5 mm, the electrode has a thickness of 0.01 to 0.5 mm, and the second aluminum nitride layer has a thickness of 0.05 to 1 mm.

5. A method for preparing an electro-static chuck with non-sintered aluminum nitride (AlN)

comprising coating aluminum nitride as a dielectric on the electro-static chuck.

6. The method according to claim 5, in which  
5 the coating of aluminum nitride is performed by depositing aluminum nitride powder by cold spray coating.

7. The method according to claim 5, which  
10 comprises:

a step for forming a first layer, in which aluminum nitride powder is deposited on a substrate by cold spray coating to form a first aluminum nitride layer as an insulating layer;

15 a step for forming a second layer, in which conductive powder is deposited on the first layer by cold spray coating to form an electrode with a separation of a distance from the circumference of the first layer to the center; and

20 a step for forming a third layer, in which aluminum nitride powder is deposited on the second layer and the separation by cold spray coating to form an aluminum nitride layer.

25 8. The method according to any one of claims 5 to 7, in which the cold spray coating is performed at a gas temperature of 400 to 500°C, a gas pressure of 3 to 7 kgf/cm<sup>2</sup>, and a distance between the nozzle and the substrate of 5 to 50 mm.

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9. The method according to any one of claims 5 to 7, in which the aluminum nitride powder is combined with 10 to 30% by weight of polyimide,

glass resin, polyvinyl alcohol or a mixture thereof,  
and pulverized.

10. The method according to claim 9, in which  
5 the pulverized mixture powder is screened to obtain  
a predetermined size.

11. The method according to claim 7, in which  
the first layer has a thickness of 0.2 to 1.5 mm, the  
10 second layer has a thickness of 0.01 to 0.5 mm, and  
the third layer has a thickness of 0.05 to 1 mm.

12. The method of claim 7, which further  
comprises, after the step for forming the third  
15 layer:

a step for curing the electro-static chuck  
after completion of the coating and leveling the  
surface; and

a step for forming auxiliary openings on the  
20 chuck after completion of the curing.

13. The method according to claim 12, in which  
the curing is performed at a temperature of 100 to  
500°C.

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14. An electro-static chuck with non-sintered  
aluminum nitride (AlN) prepared by the method  
according to any one of claims 5 to 7, which has a  
dielectric constant of at least 8, measured at a  
30 frequency of 100 KHz to 1 MHz and an electrostatic  
force of at least 150 gf/cm<sup>2</sup>, when a voltage of 500 V  
is applied.